Claims

1. A pile cloth in which a colored polyester spun-dyed yarn having a migration degree for the pigment G of 10.0 or less and a non-spun-dyed polyester yarn are intermixed and used to form the pile portion, and the entire portion is dyed with a disperse dye.

2. The pile cloth described in Claim 1 characterized by the fact that the ratio of the tanδ peak temperature of the colored polyester spun-dyed yarn T_1 to the non-spun-dyed polyester yarn tanδ peak temperature T_2 is $T_1/T_2 \geq 1.0$.

3. The pile cloth described in Claim 1 or Claim 2 characterized by the fact that the non-spun-dyed polyester yarn includes a polyester copolymerized with 1-6 wt% of polyalkylene glycol and having good dye affinity in the non-spun-dyed polyester yarn.

Detailed explanation of the invention

Industrial application field

The present invention pertains to a high-quality pile cloth. The invention further pertains to a pile cloth having a good polychromic appearance achieved by mixing many colors.

Prior art

Pile cloths made of polyester yarns have been used widely for clothing and for interior design materials in the past. In particular, the excellent lightfastness of polyester yarns can be used to advantage for the interior trim of automobiles such as for car seats, and the demand for pile cloth made of polyester yarn has been increasing.

An improvement in the quality of the pile cloth used for car seats has been promoted in recent years, and cloths comprising multiple colors are preferred over pile cloths of a single color. In order to meet the

demand, in general, a method in which a standard polyester yarn and a polyester yarn with a cationic dye affinity and a nylon yarn are woven alternately to form a pile cloth and the cloth is routinely dyed with a disperse dye, a basic dye, and an acid dye to achieve a multi-color effect.

Problems to be solved by the invention

However, in the aforementioned method, only the three colors alone can be used; furthermore, nylon is used, thus, problems such as fusion occurs during the course of fabrication of the cloth, and furthermore, the lightfastness of the produced cloth is reduced, and so it is not a satisfactory method.

Meanwhile, a pile cloth in which yarn dyed fibers dyed to produce a variety of colors are used for the pile portion is known to achieve a multi-color effect, but a yarn-dyeing process (cheese dyeing process), which increases the production cost significantly, is required, and the method is not practical, and the working range (application range) is severely limited due to the cost increase that results.

Ideally, production of a polyester pile cloth of which the pile portion comprises three or more different colors based on cloth dyeing (that is, dyeing is done after weaving the cloth) is preferred over using dyed fiber yarns.

The purpose of the present invention is to produce a pile cloth consisting of a mixture of three or more different colors at a low cost.

Means to solve the problem

The aforementioned purpose of the present invention can be achieved by a pile cloth in which a colored polyester spun-dyed yarn having a pigment migration degree G of 10.0 or less and a non-spun-dyed polyester yarn intermixed are used to form the pile portion and the entire portion is dyed with a disperse dye.

The present invention is explained in further detail below.

The polyester used in the present invention is a polyester having ethylene terephthalate as the main repeating unit.

For the polyester spun-dyed yarn, black spun-dyed yarn, [cacchi [transliteration] spun-dyed yarn, etc. have been known in the past, but restrictions on the design are severely limiting when the aforementioned commercial spun-dyed yarns (especially, black spun-dyed yarn) are used, thus, colored spun-dyed yarns are used in the present invention. It is desirable when one or more of orange, red, blue, and green spun-dyed yarns are used to achieve a high-quality appearance.

In general, the aforementioned spun-dyed yarns are formed by adding an organic or inorganic dye to polyester, but when the aforementioned selected pigment is inappropriate, the pigment in the spun-dyed yarn bleeds out when dyeing the cloth woven with a non-spun-dyed polyester yarn with a disperse dye, the non-spun-dyed polyester yarn is soiled and the quality of the polychromic appearance is greatly reduced. In order to avoid this problem, it is necessary to use a spun-dyed yarn having a pigment migration degree G of 10.0 or less, preferably, 6.0 or less, in the present invention.

The migration degree of a pigment G is a parameter used to evaluated the degree of migration of a pigment from a standard spun-dyed yarn to a polyester (non-spun-dyed yarn) obtained by forming the colored spun-dyed yarn and a standard polyester yarn into a cylinder-shaped woven cloth, boiling the spun-dyed yarn and polyester yarn in a boiling solution of the same bath at 130°C for 60 min, the L value, a value, and b value of the cylinder-shaped woven cloth of the polyester yarn before and after the boiling treatment are calculated using the SH color computer of Suga Testing Machines Co., Ltd. according to the equation shown below.

$$G = \sqrt{\Delta L^2 + \Delta a^2 + \Delta b^2}$$

$$\begin{bmatrix} \Delta L = L_1 - L_2 \\ \Delta a = a_1 - a_2 \\ \Delta b = b_1 - b_2 \end{bmatrix}$$

(L_1: L value before boiling treatment

L_2: L value after boiling treatment

a_1: a value before boiling treatment

a_2: a value after boiling treatment

b_1: b value before boiling treatment

b_2: b value after boiling treatment)

In the present invention, the aforementioned colored spun-dyed yarn and a standard polyester yarn are woven alternately to form a cloth; then, they are dyed with a disperse dye to produce a pile cloth with a pile portion having many colors.

In this case, when the ratio of the tanδ peak temperature of the colored spun-dyed yarn T_1 to the tanδ peak temperature of standard polyester yarn T_2, T_1/T_2, is 1.0 or higher, a change in hue of the spun-dyed yarn at the time of dyeing is less likely to occur and designing is easier.

For the tanδ peak temperature, the tanδ temperature curve is obtained by a Vibron [transliteration] Model DDV-II of Toyo Baldwin Co. at a frequency of 110 Hz and temperature increase rate of 3°C/min and the temperature corresponding to the tanδ peak temperature is readout.

The ratio of the tanδ peak temperature of the colored spun-dyed yarn T_1 to the tanδ peak temperature of a standard polyester yarn T_2, T_1/T_2, is 1.0 or higher (peak temperature of the spun-dyed yarn is higher), corresponds to the lower mobility of the molecular chain in the non-crystalline portion of the spun-dyed yarn. In other words, in comparison to a non-spun-dyed yarn, the spun-dyed yarn has a lower dye affinity for disperse dyes. When the spun-dyed yarn is less likely to be dyed with disperse dyes, the change in he of

the spun-dyed yarn is lower when the aforementioned yarn is mixed with a non-spun-dyed yarn and dyed; thus, a design with a polychromic appearance can be formed more readily.

In order to increase the ratio of the peak temperature of tanδ, T_1/T_2, to 1.0 or higher, for example, to increase the degree of polymerization of the spun-dyed yarn compared over that of the non-spun-dyed yarn, an increase in the degree of orientation of the non-spun-dyed polyester yarn (reduction of rupture elongation), intensifying of the heat treatment, blending or copolymerizing of a stiff chain to increase the glass transition point, etc., can be mentioned, but the method is not limited to those listed above.

Furthermore, when a polyester yarn with cationic dye affinity other than the aforementioned spun-dyed yarn is added as a polyester yarn, in addition to the spun-dyed yarn, the pile portion can be dyed with a basic dye and an acid dye as well, and as a result, the polychromic sense can be enhanced further and a high-quality appearance can be achieved.

Furthermore, when a polyester with good dye affinity copolymerized with 1-6 wt% of polyalkylene glycol (preferably, a polyethylene glycol with a molecular weight in the range of 600-2000) is used as a non-spun-dyed polyester yarn to be dyed with a disperse dye, a high proportion of the disperse dye is absorbed by the aforementioned polyester with good dye affinity and the disperse dye to be absorbed by the spun-dyed yarn and cationic dye affinity polyester yarn used in combination is reduced. In this case, the difference in the color of each yarn mixed can be seen clearly and the polychromic appearance can be enhanced further and a high-quality appearance can be achieved.

An example of the pile cloth of the present invention is shown in Figure 1. As shown in Figure 1, a red polyester spun-dyed yarn (A), polyester yarn with dye affinity (B) and a polyester yarn (C) with cationic dye affinity, and green polyester spun-dyed yarn (D) were used for a pile cloth, a standard polyester yarn was used for the base fabric and the pile portion was dyed with four colors (spun-dyed (1), disperse dye (2), and basic dye (1)) to achieve polychromic appearance.

Application examples

The present invention is explained in further detail with the application examples below.

Application Example

A red-colored polyester spun-dyed yarn with a pigment migration degree G of 6.0 and a tanδ peak temperature of 138°C (75 denier, 36 filament), a green-colored polyester spun-dyed yarn with a pigment migration degree G of 7.7 and a tanδ peak temperature of 137°C (75 denier, 36 filaments), a polyester with good dye affinity copolymerized with 4 wt% of polyethylene glycol having a molecular weight of 1000 and a tanδ peak temperature of 124°C (75 denier, 24 filaments), and a polyester yarn having cationic dye affinity and a tanδ peak temperature of 137°C and copolymerized with 2.3 wt% of 5-sodium sulfoisophthalate (75 denier, 36 filaments) were used as pile yarns, a standard polyester yarn of 100 denier and 36 filaments was used for the based fabric to produce pile woven cloth shown in Figure 1. The pile woven cloth produced was dyed with a basic dye at 130°C, and additional dyeing was done with a disperse dye at 130°C. After dyeing was completed, the aforementioned cloth was dried in the usual manner and finishing was done to produce a pile cloth. When the cloth was examined closely, the four colors were delicately mixed in the pile cloth produced and a pile cloth having a melange of tones and high-quality appearance was produced.

Comparative Example

A blue-colored polyester spun-dyed yarn with a pigment migration degree G of 12.4 and the tanδ peak temperature of 136°C (75 denier, 36 filaments) normal polyester yarn of 138°C (75 denier, 36 filaments), and a cationic dye affinity polyester yarn having the tanδ peak temperature of 137°C and copolymerized

with 2.3 wt% of 5-sodium sulfoisophthalate were used as pile yarns, and a pile cloth was produced under the same conditions described in application example. When the standard polyester yarn and cationic dye affinity polyester yarn were soiled with the pigment of the blue-colored spun-dyed yarn in the pile cloth obtained after dyeing, the difference in color of each yarn was not clear and the pile cloth lacked a polychromic appearance, quality was inferior, and had a cheap appearance.

Effect of the invention

As explained in detail above, in the present invention, a pile cloth with a multicolor mix of three or more colors at a low cost was achieved, and the four colors were delicately mixed in the pile cloth and a pile cloth having melange of tones and a high-quality appearance was produced.

Brief description of the figures

Figure 1 is a model view of an example of the pile cloth of the present invention.

1: Base fabric

A: red-colored polyester spun-dyed yarn

B: polyester with good dye affinity

C: cationic-dyed affinity polyester yarn

D: green-colored polyester spun-dyed yarn

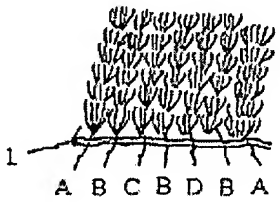

Figure 1